



# PERMAPAK SEAL BORE PACKER

## 7" X 3.250"

Manual No:  
**DL-670-7000-713**

Revision: **D**

Revision Date:  
**06/15/2016**

Authored by: J.Anderson

Approved by: R.Dyer

### A) DESCRIPTION

The Permapak Packer is a highly versatile tool which may be set on wireline or hydraulically. The Permapak Packer is frequently used on stimulation jobs where excessively high pressures and/or temperatures are encountered. By installing a Knock-out Plug, Pump-out Plug or Screw-out Plug, the Permapak may be used as a temporary bridge plug to isolate a lower zone. The zone may later be produced by removing the plug with the production string and landing the seals.

Optional bottoms are available for the Permapak for accepting Seal Bore Extensions, Non-sealing Extensions, Knock-out Plugs, Screw-out Plugs, Pump-out Plugs and Flapper Valves.

**NOTE<sub>1</sub>:** Permapak setting equipment, bottoms, and accessories are sold separately.

**NOTE<sub>2</sub>:** This packer requires at least a 30 second burn on the wireline setting tool to ensure a proper set. A burn time less than 30 seconds may shear the setting tool off of the packer before fully setting the packer.

### B) RELATED TOOLS (sold separately)

B-1) 7" Wireline Adapter Kit (WLAK) (PN 97070)—refer to technical manual *DL-970-7000-626*.

B-2) Model "H" #20 Hydraulic Setting Tool (PN 39120-3)—refer to technical manual *DL-391-20-377*.

B-3) LC #20 Hydraulic Setting Tool (PN 97465-20)—contact D&L sales.

B-4) LC Setting Kit (PN varies)—refer to technical manual *DL-394-20-229*.

B-5) 3.250" Seal bore accessories—contact D&L sales.

### C) SPECIFICATION GUIDE

CASING			TOOL OD (INCHES)	THROUGH SEALS (INCHES)	SEAL BORE (INCHES)	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)				
7	17.0 – 23.0	6.366 – 6.538	6.000	2.41	3.250	67070 67070H <sup>1</sup> 67070V <sup>2</sup>
	23.0 – 32.0	6.094 – 6.366	5.813	2.41	3.250	67071 67071H <sup>1</sup> 67071V <sup>2</sup>
	32.0 – 38.0	5.920 – 6.094	5.625	2.41	3.250	67072 67072H <sup>1</sup> 67072V <sup>2</sup>

Elastomer Trim Options: <sup>1</sup>HSN, <sup>2</sup>Viton

DIFFERENTIAL PRESSURE (MAX)
10,000 PSI

D & L OIL TOOLS  
P.O. BOX 52220 TULSA, OK 74152  
PHONE: (800) 441-3504 [www.dloiltools.com](http://www.dloiltools.com)



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## D) PRE-INSTALLATION INSPECTION PROCEDURES

**CAUTION<sub>1</sub>:** D&L ships tool connections made-up **HAND TIGHT**—labeled with hand-tight tape on the tool (Fig. 1)—unless stated otherwise. Tighten/torque all connections properly before operating tool.

Fig. 1



GENERAL THREAD CONNECTION TORQUE RECOMMENDATIONS			
STUB ACME / ACME THREADS	INTERNAL TAPERED TUBING THREADS		PREMIUM THREADS
	UP TO 2-3/8"	GREATER THAN 2-3/8"	
600 – 800 FT-LBS	600 – 800 FT-LBS	800 – 1,200 FT-LBS	Consult thread manufacturer's recommendations.

GENERAL SCREW TORQUE RECOMMENDATIONS									
SCREW SIZE (INCHES)	#6	#8	#10	1/4	5/16	3/8	7/16	1/2	5/8 and larger
TORQUE RANGE (INCH-POUNDS)	5 – 8	10 – 15	18 – 25	25 – 40	50 – 80	90 – 135	160 – 210	250 – 330	450 – 650

Before first use, D&L recommends disassembly and inspection of the tool unless stated otherwise. Ensure parts have not been damaged during shipping. Replace damaged parts with D&L replacement parts. Contact D&L sales for replacement part information.

Re-assemble the tool after inspection. Install parts in the correct order and orientation. Properly tighten connections.

Before re-using the tool, D&L recommends disassembly and inspection of the tool. Clean parts and ensure parts are in good working condition. Replace worn or damaged parts with D&L replacement parts.

When redressing the tool, D&L recommends replacement of all seals, elements, o-rings, shear screws, etc. Contact D&L sales for redress kit and/or other replacement part information.

## E) OPERATION PROCEDURES

**CAUTION<sub>2</sub>:** Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

### E-1) ON A WIRELINE

In setting the Permapak, the setting forces are transferred from the gun to the packer through the setting adapter kit. The lock ring housing is backed up while the top connection (and thus the inner mandrel) is pulled up. This movement causes the shear pins in the lock ring housing and the cones to shear and the slips to separate and set. Further stroke expands the back-up rings against the casing, packs off the element, and shears the adapter kit free of the packer.

The rubber pack-off is maintained by the slips and the inner mandrel movement is checked by the lock ring. When the packer is milled, there are two rotational locks; the lock ring and the key in the lower cone.

## F) STORAGE RECOMMENDATIONS

When preparing the tool for storage, follow the Pre-Installation Inspection Procedures. Re-assemble the tool with connections hand-tight only and in running position if applicable. Elements should be in a relaxed state—free from tension, compression, and other stresses that could cause deformation.

Store the tool, if possible, in an enclosed, temperature and humidity controlled environment. Avoid excessively high temperatures over long periods of time. Shield elastomeric parts from ultraviolet light sources. Keep tool dry and protected from condensation. Do not store in contact with or near volatile or corrosive chemicals. Do not store near ozone generating equipment or operations such as welding.



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## G) ELASTOMER TRIM TEMPERATURE GUIDE

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	70° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

## H) RECOMMENDED HAND TOOLS

- VISE
- GLOVES
- ALLEN WRENCHES
- TAPE MEASURE
- O-RING PICK
- BAR
  - 1/2-INCH
  - 3/4-INCH
- PAINT BRUSH, 2-INCH
- PIPE WRENCH, 3-FT (2 EA)
- "CHEATER" PIPE, 4-FT LONG
- ADJUSTABLE WRENCH, 12-INCH
- CORDLESS DRILL, 18V
- SNAP RING SPREADER PLIERS
- ALIGNING PUNCH
- SCREWDRIVER SET, FLAT-TIPPED
- SOCKET SETS
  - 3/8-INCH DRIVE
  - 1/2-INCH DRIVE
- HAMMERS
  - SLEDGE
  - BALL PEEN
  - DEAD BLOW

## I) DISASSEMBLY

I-1) Clamp top sub (1) in vise.

I-1.1) Remove slip ring (5) from inner mandrel (2).

I-1.2) Unscrew and remove shear screws (14) from lower cone (11).

I-1.3) Remove lower cone (11) from inner mandrel (2).

I-1.4) Remove keys (15) from inner mandrel (2).

I-1.5) Remove male and female expansion rings (7, 8), rubber retainers (9), and element (10) from inner mandrel (2).

I-1.6) Unscrew and remove shear screws (14) from upper cone (6).

I-1.7) Remove upper cone (6) from inner mandrel (2).

I-1.8) Remove slip ring (5) from inner mandrel (2).

I-1.9) Unscrew and remove shear screws (13) from lock ring housing (3).

I-1.10) Unscrew and remove set screws (12) from top sub (1).

I-1.11) Unscrew and remove inner mandrel (2) from top sub (1).

I-1.12) Unscrew and remove lock ring housing (3) from lock ring (4).

I-1.13) Unscrew and/or slide lock ring (4) from inner mandrel (2) (**NOTE<sub>5</sub>**: Left-hand threads).

**NOTE<sub>7</sub>**: Using snap ring spreader pliers, the lock ring (4) may be spread slightly to be removed from inner mandrel (2).

I-2) Unclamp top sub (1) and remove from vise.



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## J) ASSEMBLY

**NOTE<sub>3</sub>:** Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

J-1) Clamp top sub (1) in vise.

J-1.1) Assemble inner mandrel assembly and install:

J-1.1.1) Screw and/or slide lock ring (4) onto the upper end of OD threads on inner mandrel (2) (**NOTE<sub>5</sub>:** Left-hand threads).

**NOTE<sub>6</sub>:** Threads on lock ring (4) are directional—it **MUST** be installed in correct direction for tool to work properly.

J-1.1.2) Screw lock ring housing (3) onto lock ring (4).

J-1.1.3) Screw inner mandrel (2) into top sub (1).

**CAUTION<sub>3</sub>:** Do NOT wrench or clamp on seal surface.

J-1.2) Screw set screws (12) into top sub (1).

J-1.3) Align gap in lock ring (4) with threaded hole in lock ring housing (3). Screw one (1 qty) shear screw (13) into lock ring housing (3). Tighten until shear screw (13) makes contact with inner mandrel (2). Back shear screw (13) out 1/4 turn.

J-1.4) Screw remaining (6 qty) shear screws (13) into lock ring housing (3). Tighten until shear screws (13) make contact with top sub (1). Back shear screws (13) out 1/4 turn.

J-1.5) Install slip ring (5) onto inner mandrel (2).

J-1.6) Install upper cone (6) onto inner mandrel (2).

J-1.7) Align threaded holes in upper cone (6) with pocket holes in inner mandrel (2). Screw four (4 qty) shear screws (14) into upper cone (6). Tighten until shear screws (14) make contact with inner mandrel (2). Back shear screws (14) out 1/4 turn.

J-1.8) Install male and female expansion rings (7, 8), rubber retainers (9), and element (10) onto inner mandrel (2).


J-1.9) Set keys (15) in place on flat surface on lower end of inner mandrel (2).

J-1.10) Align key slots in ID of lower cone (11) with keys (9) and install lower cone (11) onto inner mandrel (2).

J-1.11) Align threaded holes in lower cone (11) with pocket holes in inner mandrel (2). Screw remaining (4 qty) shear screws (14) into upper cone (6). Tighten until shear screws (14) make contact with inner mandrel (2). Back shear screws (14) out 1/4 turn.

J-1.12) Install slip ring (5) onto inner mandrel (2).

J-2) Unclamp top sub (1) from vise and remove assembled tool.


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## K) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	17.0 – 23.0# P/N 67070	23.0 – 32.0# P/N 67071	32.0 – 38.0# P/N 67072
1	1	TOP SUB	DLMS110	67071001		
2	1	INNER MANDREL	DLMS80	67071010		
3	1	LOCK RING HOUSING	DLMS80	67070012-L-80	67071012-L-80	67072012-L-80
4	1	LOCK RING	DLMS80	67070011		
5	2	SLIP RING	DLMCIG2	67070111	67071111	67072111
6	1	UPPER CONE	DLMCIG2	67070014	67071014	67072014
7	2	MALE EXPANSION RING	DLM660BRZ	67070020	67071020	67072020
8	2	FEMALE EXPANSION RING	DLM660BRZ	67070013	67071013	67072013
9	2	RUBBER RETAINER	DLMCIG2	67070015	67071015	67072015
10	1	ELEMENT	80 DURO NITRILE	67070512	67071512	67072512
11	1	LOWER CONE	DLMCIG2	67070023	67071023	67072023
12	3	SET SCREW 3/8-16 UNC X 3/8	STEEL	SSS037C037		
13	7	SHEAR SCREW (750#) #10-32 UNF X 3/8	DLM360BRS	BSSSLT1032F037		
14	8	SHEAR SCREW (1200#) 1/4-20 UNC X 1/2	DLM360BRS	BSSSLT025C050		
15	2	KEY 3/16 X 3/16 X 1"	DLMS110	KS018X018X100		
16	10	DRIV-LOK PIN (4800#) 5/16 X 1"	4140	DLP031100*		

\*Refer to WLAK technical manual for placement.

ASSEMBLED WEIGHT		113 LBS	107 LBS	101 LBS
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## K) PARTS LIST (cont'd)

### K-1) ELASTOMER TRIM OPTIONS

**NOTE<sub>2</sub>:** For temperature range, refer to Elastomer Trim Temperature Guide.

#### K-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	17.0 – 23.0# P/N 67070H	23.0 – 32.0# P/N 67071H	32.0 – 38.0# P/N 67072H
10	1	ELEMENT	80 DURO HSN	67070512H	67071512H	67072512H

#### K-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	17.0 – 23.0# P/N 67070V	23.0 – 32.0# P/N 67071V	32.0 – 38.0# P/N 67072V
10	1	ELEMENT	80 DURO VITON	67070512V	67071512V	67072512V

## L) ACCESSORIES - BOTTOM SUBS

**NOTE<sub>8</sub>:** Standard bottom subs are listed. Other tubing sizes/configurations and threads are available. All sold separately.

DESCRIPTION	MATERIAL	THREAD CONNECTION	17.0 – 23.0# P/N 67070	23.0 – 32.0# P/N 67071	32.0 – 38.0# P/N 67072
PLAIN BOTTOM	DLMS80	-	67070018	67071018	67072018
CONCENTRIC BOTTOM	DLMS80	3-7/8-8 STUB ACME	67070610	67071610	67072610
BOX TUBING BOTTOM	-	2-7/8-8 RD EUE	67070620	67071620	67072620
PIN TUBING BOTTOM	-	-	67070630 (2-7/8-8 RD EUE)	67071630 (3-1/2-8 RD EUE)	67072630 (2-7/8-8 RD EUE)



# **PERMAPAK SEAL BORE PACKER** 7" X 3.250"

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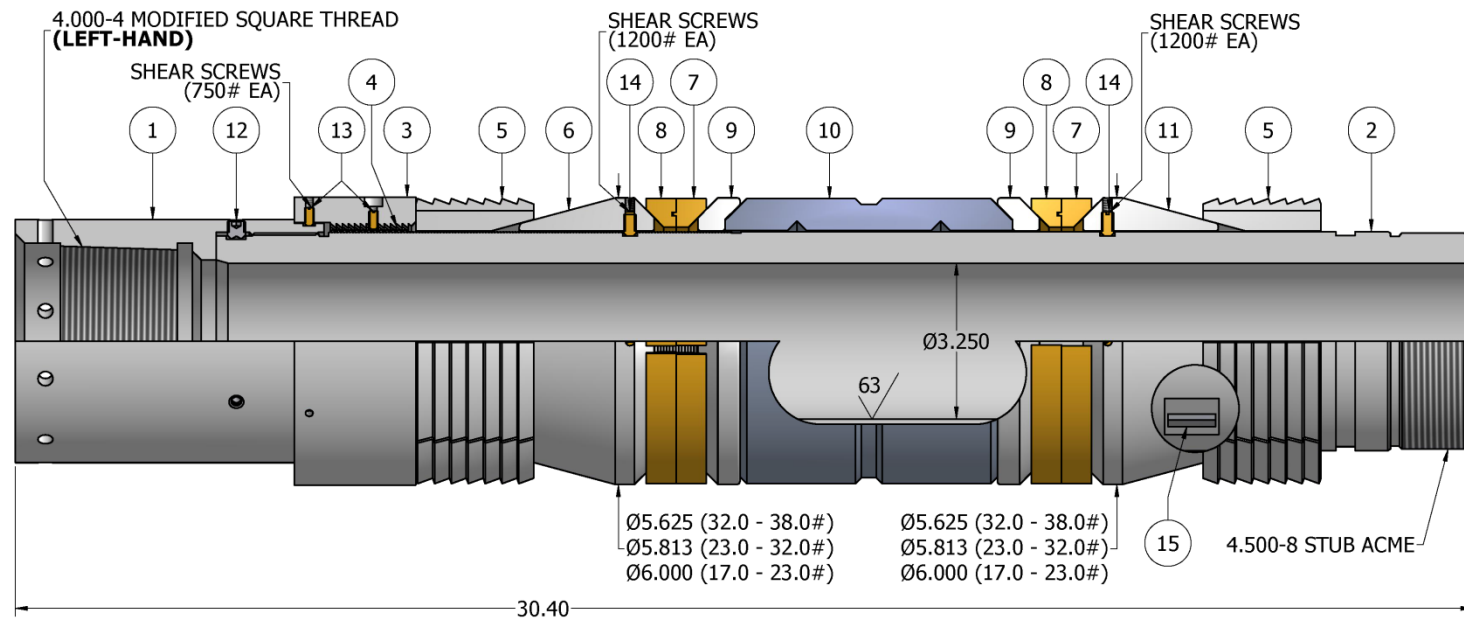
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## **M) TECHNICAL ILLUSTRATION**



**NOTE:** Bottom sub not shown. Sold separately.

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## N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
06/15/2016	D	Added General Screw Torque Recommendations; Revised Elastomer Trim Temperature Guide Nitrile was 70° - 300°F, HSN was 70° - 325°F, Accessories-Bottom Subs P/Ns for 7" X 3.250" packer	J.Anderson	C.Colvin
09/18/2015	C	Added HSN and Viton options	J.Anderson	K.Riggs
12/15/14	B	Revised max. differential pressure was 8,000	J.Anderson	B.Oligschlaeger
06/25/14	A	Created new manual	-	-